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09/870,043	05/29/2001	Roger Kenneth Moore	020211-000500US	6737

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EXAMINER

WOZNIAK, JAMES S

ART UNIT	PAPER NUMBER
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2655

DATE MAILED: 06/16/2004

7

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/870,043

Applicant(s)

MOORE ET AL.

Examiner

James S. Wozniak

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 5/29/2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3, 5.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**Detailed Action**

***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Great Britain on 5/30/2000. It is noted, however, that applicant has not filed a certified copy of the application, GB 0013241.5, as required by 35 U.S.C. 119(b).

***Information Disclosure Statement***

2. The information disclosure statement filed 12/27/01 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

***Drawings***

3. New corrected drawings are required in this application because the drawings are informal.

The requirement for corrected drawings will not be held in abeyance.

*Specification*

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Speech Synthesis Using Combined Speech Parameters from Multiple Speakers."

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 1-6, 9, 10, 12-16, 19, and 23** are rejected under 35 U.S.C. 102(b) as being anticipated by Iwahashi et al ("*Speech Spectrum Conversion Based on Speaker Interpolation and Multi-functional representation with Weighting by Radial Basis Function Networks*," 1995).

With respect to **Claim 1**, Iwahashi discloses:

A method of providing signals for a synthetic voice by way of derived voice-representative data, in which the derived data is derived by combination of data representative of first and second voices, the combined data including selected parameters of a formant-type voice

synthesizer (*speech synthesizer utilizing a combination of target speaker and pre-stored speaker parameters through interpolation, Page 142, Section 3.1*).

With respect to **Claim 2**, Iwahashi recites:

The synthesizer is a synthesis-by-rule (SbR) system (*rule-based concatenative synthesis system, Page 150, Section 6*).

With respect to **Claim 3**, Iwahashi discloses:

The first and second stored data and the derived data include a plurality of parameters (*cepstrum and log area ratio parameters, Page 142, Section 2*).

With respect to **Claim 4**, Iwahashi recites:

The combination includes interpolation or extrapolation of one or more parameters of the first and second stored data (*interpolation, Page 142, Section 3.1*).

With respect to **Claim 5**, Iwahashi discloses:

Various parameters are interpolated or extrapolated to different extents (*application of weighting functions to interpolated parameters of different speakers, Pages 143-144, Section 4.1, and Fig. 2*).

With respect to **Claim 6**, Iwahashi recites:

A plurality of parameters are derived by interpolation or extrapolation of corresponding parameters of a plurality of voices, the ratio of interpolation or extrapolation being different for different parameters (*interpolated parameters (cepstrum parameters and log area ratios, as applied to Claim 3) associated with various speakers having different interpolation ratios resulting from different applied weighting functions, Pages 143-144, Section 4.1, and Fig. 2*).

With respect to **Claim 9**, Iwahashi discloses:

Derived data includes parameters interpolated or extrapolated within an acceptable region of a parameter space (*interpolating parameters in a speaker's spectral space, Page 142, Section 3.1, and Pages 143-144, Section 4.1*).

With respect to **Claim 10**, Iwahashi recites:

The parameters are control parameters of a formant synthesizer (*formant synthesizer and cepstrum and log area ratio parameters utilized in the generation of synthesized speech, Pages 141-142, Section 2*).

**Claim 12** contains subject matter similar to Claim 1, and thus, is rejected for the same reasons.

**Claim 13** contains subject matter similar to Claim 4, and thus, is rejected for the same reasons.

**Claim 14** contains subject matter similar to Claim 5, and thus, is rejected for the same reasons.

With respect to **Claim 15**, Iwahashi discloses:

First and second models have characteristics that differ in respect of one or more of the following: gender of a speaker, accent of a speaker or age of a speaker, emotion of a speaker, rate of speaking and style of speaking (*gender, Pages 146-148, Section 5.2*).

With respect to **Claim 16**, Iwahashi recites:

The first and second models originate from different speakers (*multiple speakers, Page 142, Section 3.1*).

**Claim 19** contains subject matter similar to Claim 10, and thus, is rejected for the same reasons.

With respect to **Claim 23**, Iwahashi discloses:

A formant-based speech synthesizer operative according to a method of claim 12 (*format-based synthesizer, Pages 141-142, Section 2*).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 7, 8, 17, 20, and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwahashi et al.

With respect to **Claims 7 and 8**, Iwahashi teaches cepstrum parameters and log area ratios corresponding to different speakers that are interpolated to different extents based upon associated weighting functions, as applied to Claim 6. Iwahashi does not teach specific contribution amounts of parameters associated with different speakers, specifically 100% and 75% of first voice parameters and 0% and 25% of second voice parameters with respect to Claim 7, and 75% and 50% of first voice parameters and 25% and 50% of second voice parameters with respect to Claim 8.

Although not disclosed by Iwahashi, it would have been obvious matter of design choice to vary speaker parameter contribution amounts associated with different, since the applicant has not disclosed that producing a synthesized voice by utilizing the specific amounts of speaker

Art Unit: 2655

parameters in interpolation noted above solves any specific problem or is for any particular purpose other than to produce a desired voice output (*varied parameter contributions to produce a desired synthesis output, Specification, Page 4, Lines 8-27*). Therefore, it would be an obvious matter of design choice to utilize the noted contribution amounts in order to achieve a desired synthesis output.

With respect to **Claim 17**, Iwahashi teaches the speech synthesizer utilizing multiple speaker parameters in an interpolation method for synthesis, as applied to Claim 1. Iwahashi does not specifically suggest that the parameters could originate from different speaking voices of the same speaker, however, the examiner takes official notice that it is well known in the art to utilize speech parameters of different voices of one speaker in an interpolation method in order to change the pitch of a synthesized signal. Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to utilize speech parameters from different voices of one speaker in order to change pitch and maintain a speech synthesis output closer to that of the actual speaker because no alternate speaker data is being used.

With respect to **Claims 20 and 21**, Iwahashi teaches the speech synthesizer utilizing multiple speaker parameters in an interpolation method for synthesis, as applied to Claim 1. Iwahashi does not specifically suggest the generation of speech parameters periodically every frame, however, the examiner takes official notice that it is well known in the art to generate speech parameters once for every frame of speech data to sufficiently represent a speech signal for applications such as speech coding or synthesis. Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to generate speech parameters once every frame of speech data in order to sufficiently represent a speech signal for speech synthesis.



8. **Claims 11, 18, 22, 24, and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwahashi et al in view of Malsheen et al (*U.S. Patent: 4,979,216*).

With respect to **Claim 11**, Iwahashi teaches the speech synthesizer utilizing multiple speaker parameters in an interpolation method for synthesis, as applied to Claim 1. Iwahashi does not teach that the parameter values are stored in a table, however, Malsheen discloses:

The parameters are table values in an SbR synthesizer (*Col. 18, Lines 53-57*).

Iwahashi and Malsheen are analogous art because they are from a similar field of endeavor in speech synthesis. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to combine the use of a parameter table in speech synthesis as taught by Malsheen with the speech synthesizer utilizing multiple speaker parameters in an interpolation method for synthesis as taught by Iwahashi to provide a means of easily accessing speech parameters for efficient speech synthesis. Therefore, it would have been obvious to combine Malsheen with Iwahashi for the benefit of obtaining easily accessed speech parameters in a speech synthesizer, to obtain the invention as specified in Claim 11.

With respect to **Claim 18**, Iwahashi in view of Malsheen teaches the speech synthesizer utilizing multiple speaker parameters stored in a table in an interpolation method for synthesis. Iwahashi in view of Malsheen does not specifically suggest the use of multiple tables; however since the speech parameters taught by Iwahashi pertain to multiple speakers, as applied to Claim 1, it would have been obvious to one of ordinary skill in the art, at the time of invention, to store the parameters for the individual speakers in separate tables to avoid confusion between speakers' parameters that could result in an undesired synthesis output. Therefore, in order to

prevent confusion between parameters pertaining to multiple speakers, it would have been obvious to store speech parameters in separate tables for each speaker.

With respect to **Claim 22**, Iwahashi teaches the speech synthesizer utilizing multiple speaker parameters in an interpolation method for synthesis, as applied to Claim 1. Iwahashi does not specifically suggest system and method implementation in a text-to-speech method, however, it is well known in the art to use speech synthesis for text-to-speech conversion as is evidenced by Malsheen:

A method of text-to-speech conversion including speech synthesis by a method according to claim 12 (*Col. 5, Lines 19-34*).

Iwahashi and Malsheen are analogous art because they are from a similar field of endeavor in speech synthesis. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to combine the text-to-speech conversion method as taught by Malsheen with the speech synthesizer utilizing multiple speaker parameters in an interpolation method for synthesis as taught by Malsheen in order to implement the speech synthesis method taught by Iwahashi in a practical and well-known text-to-speech application to produce a more natural speech output. Therefore, it would have been obvious to combine Malsheen with Iwahashi for the benefit of obtaining a text-to-speech method capable of producing more natural synthesized speech, to obtain the invention as specified in Claim 22.

With respect to **Claim 24**, Iwahashi in view of Malsheen teaches the speech synthesizer utilizing multiple speaker parameters stored in a table in an interpolation method for synthesis, as applied to Claim 18. Specifically Malsheen teaches the use of a table for storing speech parameters utilized in speech synthesis, as applied to Claim 11. Iwahashi in view of Malsheen

does not specifically suggest a table derivation stage, in which the parameters created from interpolating speech parameters from various speakers are stored, however, since Malsheen teaches the use of a table for storing speech parameters used for synthesis and Iwahashi teaches an interpolation method that creates adapted speech parameters for synthesis from speech data from multiple speakers, it would have been obvious to one of ordinary skill in the art, at the time of invention, to store the adapted speech parameters taught by Iwahashi in a table for synthesis so that a synthesizer can easily access adapted speech parameters for efficient speech synthesis processing.

With respect to **Claim 25**, Iwahashi in view of Malsheen teaches the speech synthesizer utilizing multiple speaker parameters stored in a table in an interpolation method for synthesis, as applied to Claim 18. Iwahashi in view of Malsheen does not specifically suggest implementing the table derivation method as a component of a software system; however, the examiner takes official notice that it is well known in the art to implement speech data processing commands as part of a software system. Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the table derivation method as a part of a software system in order to increase method compatibility and usability by providing a means for method use with multiple computer systems.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Iwahashi (*U.S. Patent: 5,704,006*)- teaches a speech synthesis method that combines speech data from multiple speakers in order to produce a more natural synthesis output.
- Otsuka et al (*U.S. Patent: 5,745,650*)- discloses a rule-based text-to-speech synthesizer featuring pitch information for synthesis stored in a table.
- Gulick (*U.S. Patent: 5,763,801*)- teaches a music synthesis method implemented using multiple wavetables for storing pitch data that is interpolated in order to change the pitch of a music signal.
- Huang et al (*U.S. Patent: 5,905,972*)- teaches the interpolation of speech parameters from multiple voice fonts to produce more natural synthesized speech.
- Page et al (*WO 9907132 A1*)- discloses a method of voice message synthesis that utilizes interpolation of pitch data from a same speaker.


10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (703) 305-8669 and email is James.Wozniak@uspto.gov. The examiner can normally be reached on Mondays-Fridays, 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached at (703) 305-4827. The fax/phone number for the Technology Center 2600 where this application is assigned is (703) 872-9306.

Art Unit: 2655

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the technology center receptionist whose telephone number is (703) 306-0377.

James S. Wozniak  
6/3/04

  
**SUSAN MCFADDEN**  
**PRIMARY EXAMINER**